

# New distribution record and a review on *Hipposideros fulvus* Gray, 1838 (Mammalia: Chiroptera: Hipposideridae) distribution from Andhra Pradesh, India

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**ABSTRACT:** We report a new distribution record and review the earlier records of the Fulvous roundleaf bat, *Hipposideros fulvus*, from Andhra Pradesh, India, based on a female specimen collected from Hyderabad, India. This species has been hitherto reported from only two localities in Andhra Pradesh and has been missed out from most of the reports and publications.

The Family Hipposideridae comprises roundleaf bats distributed in the old world tropics ranging from Africa through Asia to Australia (Simmons 2005). About 16 species of hipposiderids belonging to four genera – namely, *Hipposideros* Gray, 1831; *Asellia* Gray, 1838; *Coelops* Blyth, 1848, and *Triaenops* Dobson, 1871 – are distributed in South Asia (Srinivasulu *et al.* 2010). The roundleaf bats are characterized by short muzzle and complex noseleaf bearing horizontal horseshoe surrounding the nostrils, often thrown into skin folds and associated leaflets, and with sella and connecting process being absent (Hill *et al.* 1986). The taxa belonging to the genus *Hipposideros* are small to medium-sized bats (forearm length between 33.0 and 99.00 mm) with a medium-sized tail (20.0 to 64.0 mm); noseleaf with anterior leaf with or without median emargination, an intermediate and a posterior leaf; supplementary leaflets absent or, when present, may range between one and four, and in some species the last supplementary leaflet is much reduced; ears pointed with large antitragus and no tragus; interfemoral membrane broad, completely enclosing the tail except the extreme tip mostly, and exceptionally up to 5 mm in some species (Hill *et al.* 1986).

While conducting surveys to document roundleaf bats in and around Hyderabad, Andhra Pradesh, we discovered a few individuals of roundleaf bats in the cellar of an ancient temple near Saraswathi Gudem ( $17^{\circ}17' N$ ,  $78^{\circ}51' E$ ) on 18 December 2011. A voucher specimen (Figure 1) was collected and deposited (NHM.OU.CHI.5-2011) in the Natural History Museum of Osmania University, Hyderabad, India. The external and craniodental measurements to the nearest 0.01 mm were taken using digital vernier calipers. The measurements taken are: Forearm: 42.20; Head-Body Length: 40.30; Tail: 28.12; Ear: 19.47; Hindfoot: 6.94; Greatest Length of Skull: 18.70; Condyllo-basal Length: 16.69; Condyllo-canine Length: 16.30; Zygomatic Breadth: 9.24; Braincase Breadth: 9.07; Mandible Length: 12.09; Maxillary Toothrow: 6.64; Posterior Palatal

Width: 5.69; and Anterior Palatal Width: 4.11. MaxEnt modeling (Phillips *et al.* 2006) was conducted using the known locality records and 19 bioclimatic environmental variables and one altitude variable (Hijmans *et al.* 2005) to predict the possible range of the species.



**FIGURE 1.** An adult female (NHM.OU.CHI.5-2011) of the Fulvous Roundleaf Bat, *Hipposideros fulvus*, from Hyderabad, India.

Based on the external and craniodental measurements (Figure 2) the specimen was identified as the Fulvous



**FIGURE 2.** Skull of an adult female (NHM.OU.CHI.5-2011) of the Fulvous Roundleaf Bat, *Hipposideros fulvus*, from Hyderabad, India. Scale – 5 mm.

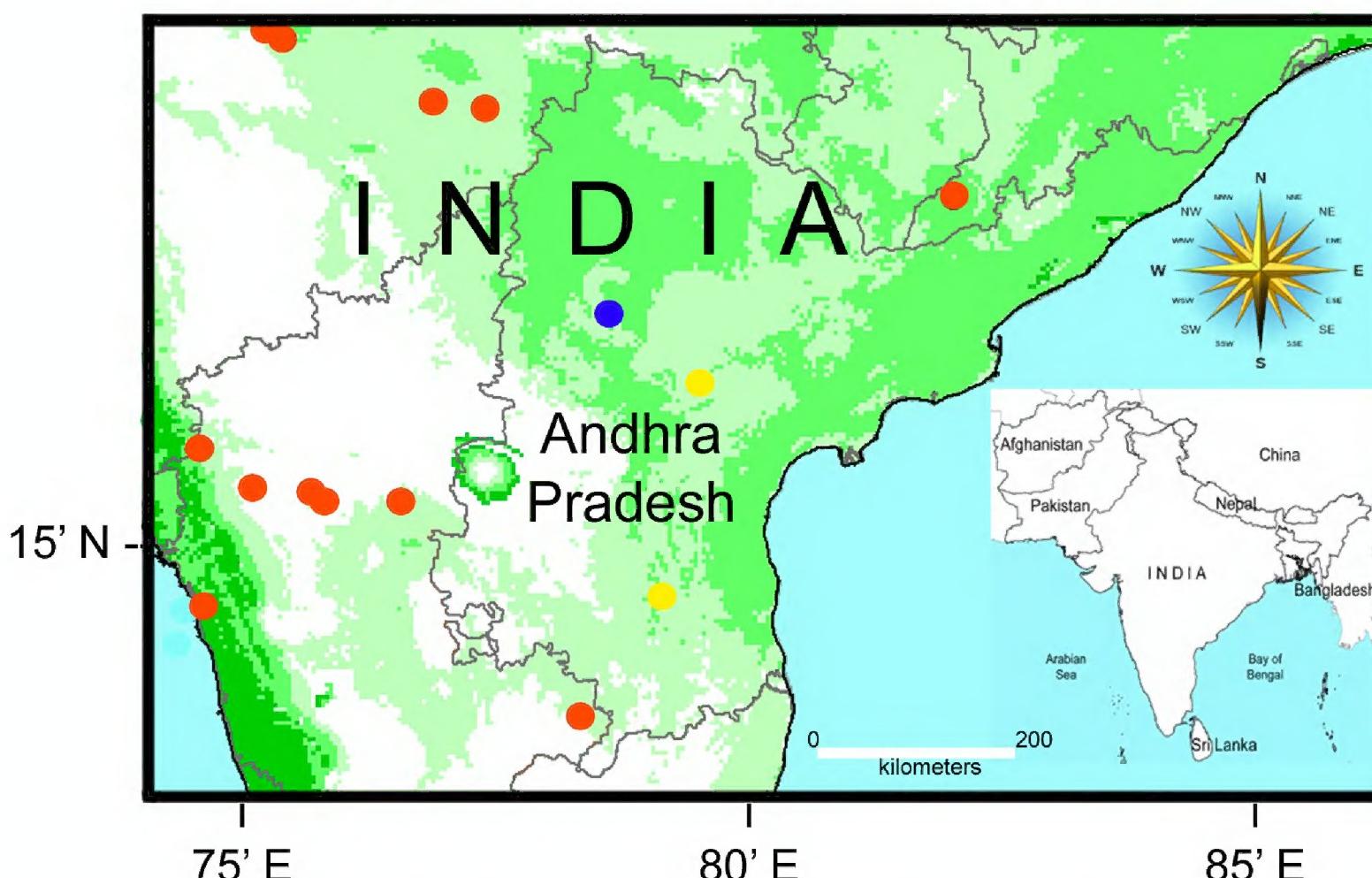
roundleaf bat *Hipposideros fulvus* Gray, 1838 (after Bates and Harrison 1997; Srinivasulu *et al.* 2010). This species is a small to medium-sized bat with characteristically very large ears (19.00 to 26.00 mm in length). Externally, it resembles *Hipposideros ater* Templeton, 1848 and *Hipposideros pomona* Andersen, 1918 but differs being slightly larger (average forearm length 40.4 mm vs. 36.3 mm and 39.0 mm, average condylocanine length 15.6 mm vs. 13.6 mm and 14.4 mm) and presenting a distinct dentition pattern (Figure 3), especially with respect to mandibular canine and anterior premolars (Bates and Harrison 1997; Srinivasulu *et al.* 2010).

The Fulvous roundleaf bat, *H. fulvus*, is endemic to South Asia and is known from Afghanistan, India, Nepal, Pakistan, and Sri Lanka (Simmons 2005). In India, it is known from Andaman and Nicobar Islands, Andhra Pradesh, Bihar, Gujarat, Haryana, Jharkhand, Karnataka,



**FIGURE 3.** Occlusal view of the mandible of an adult female (NHM.OU.CHI.5-2011) of the Fulvous Roundleaf Bat *Hipposideros fulvus* from Hyderabad, India. Scale – 2 mm.

Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, and Uttar Pradesh (Bates and Harrison 1997; Molur *et al.* 2002; Vanitharani 2006, 2007). Although this species has a wide distribution, there is a gap with respect to its occurrence in Andhra Pradesh, both spatially and temporally. In Andhra Pradesh, *H. fulvus* was hitherto known from near Nagarjunasagar in Guntur district (collected in 1962) (Chakraborty *et al.* 2004) and Vontimitta range in Cudappah district (collected in 1930 by N. A. Baptista) (Figure 4). This latter record is from the



**FIGURE 4.** Distribution of the Fulvous Roundleaf Bat, *Hipposideros fulvus* (red circles – locality records from other parts of India, yellow circles – earlier locality records from Andhra Pradesh, blue circle – present locality record reported in this paper), overlaid on Maximum Entropy Species Distribution Modeling projection onto 19 bioclimatic environmental variables and one altitude variable. The MaxEnt modeling was conducted by randomly selecting 75% of the points to generate the model and 25% to test, the area under the curve (AUC) for the receiver operating characteristic of testing points is  $0.971 \pm 0.008$ . Warmer colors show areas with better predicted conditions.

site that has been historically under the then Madras State, thus included by some recent authorities as in Tamil Nadu, India (Ghosh 2008). Through this note, we report a new distribution record of *Hipposideros fulvus* from Hyderabad, Andhra Pradesh, India, based on a single female specimen. The MaxEnt modeling predicts that the species could be more widespread than presently known with greater possibilities of its occurrence in the Eastern Ghats and the Godavari river basin.

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